Volatility of Escalating Construction Costs Analysis

Problem

The volatility of the cost of construction materials in the current market coupled with the escalation of labor wages has increased the risk of maintaining the estimated budget throughout the duration of a project. This was especially true for the budget of the Health and Human Services Building at Coppin State University because the project was bid in three phases over a ten month period and Hurricane Katrina hit weeks after the estimate was performed. The University System of Maryland needed to ask the State of Maryland to increase the budget. The owner considered removing the Early Childhood Demonstration Center in order to lower the new estimated budget to the original budget.

Solution

Altering the way contractors bid on projects will allow the owner to pay the true inflation and escalation costs of material and labor. Increasing the simplicity of bid documents and changing the selection process of contractors will increase competition and therefore help to lower cost.

Methodology

The market conditions for the last decade were researched focusing on the cost escalation of materials and labor. A list of questions for contractors, construction managers, designers and owners was developed from the knowledge gained during research. A list of questions for each party is located in Appendix B. An email was sent to industry professionals requesting a phone interview. The cover letter is available in Appendix B. Contractors, construction managers, designers, and owners as well as an economist were then interviewed about their opinions and current practices. The notes from each interview can be viewed in Appendix B. The results from both research and interviews were then compiled to produce a recommendation.

Resources & Tools

Dr. Michael Horman – The Pennsylvania State University
Dr. David Riley – The Pennsylvania State University
Interview Participants Listed in Table 1
Multiple Issues of ENR – Engineering News Record

Contacts for Material Escalation Interview		
Brian Barnes	Contractor	Finishes, Inc
John Bechtel	Owner	The Pennsylvania State University
Brook Behner	Contractor	Homewood General Contractors, Inc
Lee Evey	Construction Manager	Design Build Institute of America
Sarah Forrest	Estimator	Hensel Phelps Construction Co.
Scott Franckowiak	Contractor	MBR Construction
Hope Furrer	Designer	Hope Furrer Associates
Bob Grottenthaler	Construction Manager	Barton Malow Company
Merton Harris	Designer	RMF
Matt Herbert	Designer	Design Collective, Inc
Telly Koutris	Contractor	David Allen Company
Keith Lambert	Contractor	Zephyr Aluminum
Mike Miller	Construction Manager	Southland
Jorge Scotti	Owner	University of Maryland, Baltimore
Ken Simonson	Economist	AGC Chief Economist
Todd Sody	Contractor	Sody Concrete
Todd Vochinsky	Estimator	Barton Malow Company

Table 1: Interview Participants

Market Conditions

The construction industry has been plagued with the escalation of material prices since early 2004 until mid-2006. This was a drastic change from the almost inflation-free era between 2001 and 2003. In the last few months cost escalation has decreased. However by the end of 2007, material costs are expected to rise between six and eight percent and labor wages are predicted to increase five percent.

The cost of construction has increased for every trade due to the increase in fuel prices. The price of diesel gas has escalated which, in turn, has escalated the price of any material that is being shipped or hauled for both raw and finished products. Ports, rail lines, and trucking companies have recently experienced demand surges that have pushed up the delivery cost for materials. The material costs that have impacted the industry the most have been the cost of steel, concrete, copper, aluminum, glass, gypsum board and lumber. All petroleum products, including roofing/waterproofing, PVC pipe, and asphalt, have also been affected by fuel cost escalation.

The cost of cast-in-place concrete is influenced by multiple factors. The direct factors contributing to this escalation are cost of cement and steel. The escalation of steel reinforcing prices escalates the overall cost of cast-in-place concrete. The escalation of lumber has indirectly increased cost of cast-in-place concrete due to its use as formwork. The use of reusable forms like gang forms and steel framed forms with plywood can be costly. In today's market, it is becoming increasingly more difficult to find a low-cost solution for forming cast-in-place concrete. The price of cement has increased by ten percent each year in the last three years. This dramatic increase is due to the large amount of energy needed for processing and shipping. The cost escalation of sand, gravel and crushed stone has also added to the cost escalation

of concrete. As the materials used to produce concrete escalate in cost the cost of concrete rises as well.

The change in the global economy has also increased material cost escalation. The demand for finished structural steel, as well as all other construction commodities, has increased in past years, which has lead to a shortage of these materials. The economic growth of India and China has lead to a higher demand for materials worldwide. The consumption of materials by Asia coupled with the United States boom in residential building has lead to an extremely high demand. The demand has spanned industry-wide in both commercial and residential construction. Materials like copper, aluminum, glass, gypsum board, and lumber that are used in both commercial and residential construction are experiencing an even higher demand. This high demand has increased the procurement time of items form between one and two weeks to between six and eight weeks. Barton Malow has experienced difficulty in receiving full orders. The high demand has forced suppliers to deliver orders in installments. The increase in product lead time has either lengthened project schedules or increased costs in order to stay on track.

While material prices have been escalating labor costs have increased as well, which has only contributed to a higher overall building construction cost. In the past decade the construction industry has created one out of every ten new jobs. However, in recent years new employment has decreased and wages have increased. According to the AGC, in the last year alone, hourly wages have increased 4.8% and employment levels have decreased 0.2%. Most recently the residential boom has subsided. This decline in residential construction has eliminated the lower paying, unskilled job positions while boosting the higher paid, highly-skilled non-residential job positions. The economy is experiencing low levels of unemployment which will decrease the number of applicants. Recently, Baltimore in particular, has experienced a shortage of skilled masons. The shortage of apprentices in past years coupled with the retirement of the older, experienced, and highly skilled masons has left the field stagnant and non-renewable. There are few skilled workers left in the field to be teachers for entering apprentices. Not only are there fewer laborers, but the amount of work in the area has increased. This allows contracting firms to demand and to receive higher fees. In the end, the result is higher wages with lower productivity.

With the economic growth continuing to increase in the United States and Asia the high material demand will only continue to escalate. Low levels of unemployment and the retirement of the current skilled workforce will increase the scarcity of the labor force. Although there may be a few sporadic monthly lulls, overall the cost of construction will continue to escalate in future years. The volatile escalation of construction costs will make it difficult to manage project budgets over extended periods of time.

Current Strategies

Material escalation is a risk for contractors, construction managers, designers, owners and suppliers involved in the construction process. Currently, the typical way to mange this risk in our industry is to pass it on to another party. The party who is absorbing the risk usually requires monetary compensation. In the end, the owner is

paying a premium for something that may never happen through a contingency or an escalated bid.

Recently, the University System of Maryland decided that Coppin State University would build a new Health and Human Services Building. An architect, Design Collective, Inc, was hired and the estimated cost of the new building was calculated. This calculated cost was then multiplied by a certain percentage for inflation. The design process continued as the University System of Maryland asked the state of Maryland for enough money to cover the estimated cost plus inflation. A construction management firm, Barton Malow Company, was hired with a soft guaranteed maximum price (GMP) contract. Barton Malow's fee for the project was established for the estimated cost of the building. After contractors were awarded the project a fixed GMP was established between the University of Maryland and Barton Malow.

The owner, University of Maryland, had already included a standard inflation multiplier in their cost estimate based on the size and duration of the project and assumed that it is enough money to cover the cost of the building. The University of Maryland passed any additional cost escalation exceeding their inflation multiplier onto the contractor who in turn passes a portion of the risk to the vendor. The contractor is expected to hold the bid price for ninety days. Some vendors/suppliers, depending on the cost volatility of the material, will only hold their price for seven days. The contractor increases the bid amount enough to cover any escalation exceeding seven days and the vendor has already included a premium for the cost escalation over the seven day period in the price given to the contractor. The owner has passed risk onto three different parties and each of these parties has demanded higher compensation to cover this risk. The actual cost of inflation and material escalation for the duration of the project may be significantly lower than the combined total the owner pays in the end. The figure below (Figure 1) depicts the events that have occurred through the bidding process.

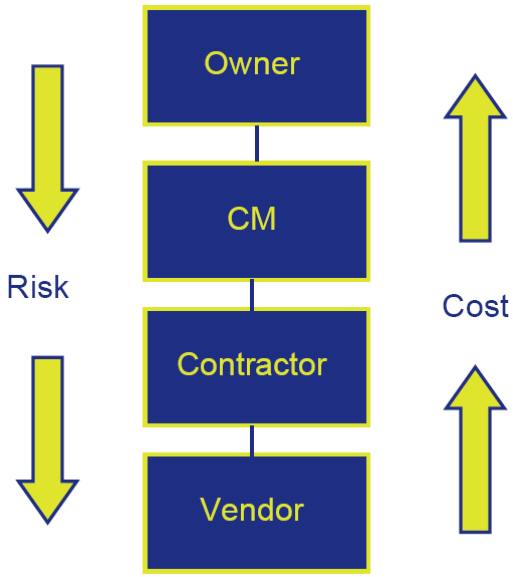

Figure 1

Conclusion & Recommendation

It is likely that the owner will end up paying significantly more money for the luxury of passing on the risk involved with material and labor escalation. The alteration of the current contractor bidding process will allow the owner to manage the risk of escalating construction costs more cost effectively. The items included in the contractor's bid price and the contractor selection process needs to change in order to allow the owner to manage this risk. The contractor should give a bid price based on the current cost of materials and labor including overhead and profit and the owner should compensate the contractor according to the actual inflated and escalated cost. The contractor should be selected through an interview process.

The contract between the owner and the contractor should specify either a given rate of material escalation per quarter or preferably a specific commodity index that will reflect the amount of increase that has occurred for the past quarter. The contractor's last pay application for that quarter should then reflect the change (increase or decrease) in material prices only for the materials purchased that quarter. The contract between the owner and the contractor should also address the increases in labor wages. Typically employees receive a raise yearly. The owner should apply the same concept for material escalation as labor wage escalation but re-evaluate the change on a yearly or bi-yearly basis rather than quarterly. This solution will allow the owner to pay the true cost of inflation and material and labor escalation which could essentially allow the owner to get more building for the same budget.

Altering the selection process of contractors will help to increase competition which will help decrease the problem of high wages with low productivity. The first step is to ensure that the designer and the construction manager complete a thorough constructability review and coordinate the documents that contractors will utilize to bid the job. A more simplistic set of documents that do not need to have additional addendums is likely to increase the number of contractors who submit a bid. An effective way to accomplish this is to involve a contractor in the constructability review. Involvement of a contractor will also ensure that the current estimate is in line with the current market. A contractor pre-qualification system should conduct a review of the contractors past projects. The contractor should be evaluated on their past performance and how it relates to the current project based on recent completion a high quality and relevant project. Once pre-qualified, the contractor will be asked to participate in an interview and to submit a fee proposal and a technical submission. The interview, the fee proposal, and the technical submission will be scored separately and then the contractor with the highest overall score will be awarded the job.

The owner does not need to be involved in the implementation of these two solutions. Involvement of the owner in these processes can be dependent on the level of experience of the owner. The construction manager should be capable of executing both solutions without the help of the owner. Alteration of the selection process of contractors will increase the quality of a project while lowering the cost.